have not been treated, as controls and find many times two or more of these latter will give a positive Schick reaction.

If after immunizing doses a child has a positive Schick test, we wait another ninety days, re-Schick and if still positive repeat the toxoid or toxin antitoxin, using, however, only two doses three weeks apart. We then re-Schick in another ninety days. The test is usually negative at that time.

The question of exact dosage and time interval between doses is not definitely settled yet, but until that time the present technique is workable and does no harm but much good.

It has never been our experience to see any sensitization to horse serum from the use of the toxin antitoxin, with one exception, since the first use of this material a number of years ago, and in many hundreds of immunizations. It is possible to have it occur, but this should not deter us from using the material in the older child if he is susceptible to diphtheria. This is another argument for the early immunization of the child with the toxoid.

The statistics that Doctor Kositza presents for the Los Angeles district show that the education that has been going on for the past few years is bearing fruit. However, the gradual increase in the morbidity and mortality rates of the past two years shows that there has evidently been a letting up of the intensive campaign for diphtheria immunization on the part of ourselves as practitioners, and the work of education may be taken over by the health authorities.

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Doctor Kositza (Closing).—I wish to thank Doctors Thelander, Stevens, and Scott for discussing my paper.

Since this paper has been written we have again resumed the use of toxoid in our diphtheria immunization in the Los Angeles City schools. We are endeavoring to carefully check on the type and frequency of reactions to toxoid in children over six years of age.

THE LURE OF MEDICAL HISTORY*

FIFTY YEARS OF PROGRESS IN THE PREVENTION OF DISEASE†

By J. C. Geiger, M. D.
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I

THE revolution in preventive medicine, so ably begun by a chemist, the revered Louis Pasteur, was given great impetus by Ryndall, a physicist, and Robert Koch, a bacteriologist. Bacteriology has, in turn, revolutionized our isolation and quarantine procedures, particularly as to recognition of the existence of the healthy carrier. There is no doubt that Theobald Smith focused attention on the importance of transmission of disease by insects. Biggs really modernized public health practice in the United States.

It was not many years ago that the conscientious health officer first offered to quarantine the cases of communicable disease that busy practitioners happened to report. When the quarantine terminated—the time being usually set by convenience or by social standing—the premises were diligently fumigated. Many communities expressed heartfelt gratitude for this service. But quarantine and terminal fumigation are both relatively unimportant features today in the control of communicable disease. Fumigation, with its frequent destruction of clothes, bedding, etc., was time and energy wasted.

An entirely new conception of public health arose when healthy carriers were recognized to exist, and when mild, atypical or missed cases could and did account for the spread of disease. It is now axiomatic that, if communicable diseases are to be controlled, we must investigate and determine their source and destroy it, and learn how diseases are disseminated. But in many common infectious diseases we must deal primarily with persons, not things.

There are fanciful routes of infection popularly suggested in some diseases; even now the cancer house is spoken of as was the tuberculosis house in years gone by. Diseases carried by letter are not quite in the limbo of things forgotten. Some genuine modes of transmission, in a few diseases, do stretch the plausibilities. We must provisionally accept all possibilities, but never exclude the usual routes. These are, for all practical purposes, contact, milk, and water.

The control of any disease depends, first, upon an early and accurate diagnosis; second, the source, vehicle, or avenue of infection; and third, the prompt blocking of these with every reasonable force. It depends also on public confidence in the health officer, for sometimes he must take extraordinary steps. There is no need, ordinarily, to prevent contact of persons; but drinking water and milk should be carefully analyzed before their use is permitted.

One of the difficulties here becomes acutely manifest. Much laboratory work is inconclusive; specimens examined today and found potable may tomorrow show an unhealthful condition. To make milk and water safe for human consumption means an untold number of inspections, ceaseless vigilance and a balanced understanding of the factors operating within and without the supplies. It is possible to discover an infecting organism in the water and milk, but seldom indeed is it discovered or even attempted. The most important and most difficult control is the isolation of the infected, since it is not feasible to go through the whole community. Quite often, milk handlers and others are subjected to examinations of all types, particularly of specimens of the urine, the feces, and from the throat; the value of the examinations depends upon the skill of the laboratory technician and the promptness of the investigation.

STATISTICAL EPIDEMIOLOGY

Two of the modern weapons of public health work are bacteriology and epidemiology. Many of our older health officials regard them as synonymous. But lemology, or lemography, meaning the sum of human knowledge as to pestilence, was long known before bacteriology came into existence. The term "epidemiology" is more frequently used today. Epidemiology is a science with ramifications, including occurrence, incidence, distribu-

* A Twenty-five Years Ago column, made up of excerpts from the official journal of the California Medical Association of twenty-five years ago, is printed in each issue of California and Western Medicine. The column is one of the regular features of the Miscellany Department of California and Western Medicine, and its page number will be found on the front cover index.

† One of a series of public lectures by invited speakers, conducted by the Stanford University School of Medicine.

† From the Department of Public Health, San Francisco.

tion, infectivity, virulence of the causative microbe or viric factor, and seasonal or calendar periodicity both present and past. Necessarily, the epidemiologist must have a broad training in bacteriology, immunology, medical zoölogy and parasitology, statistics, public health administration, and sanitary engineering.

Epidemiology must have a starting point, and this is usually statistical. Standard regulations cover about forty-two notifiable diseases. The discerning health official must have a daily, weekly, or monthly report, or all three; he must picture the location and number of cases with charts, and must know the previous movements of the patients. Highly desirable is the history of past incidence, in terms of an average for the nonepidemic period, the so-called "norm" or "expectancy." Such averages, when plotted in curves and corrected as to population estimates, may give reasonable endemic or constant seasonal information. For instance, if the expectancy or norm, or endemic constant, is fifty cases of a disease for a given locality and period, say a month, and the number of reported cases is 100, then the epidemic index in percentage would be 200, basing the normal on 100. With such information, and with care as to deviations (changes in population, etc.), the health official has a useful basis for collection purposes and for forecasting and broadcasting.

FIELD EPIDEMIOLOGY

The discovery of the microbe, or ultravisible viric causes of disease, as in acute anterior poliomyelitis (infantile paralysis); or of the parasite without its intermediate host, as in amebic dysentery; or with such a host, as in malaria; and the discovery of the manner of spread from person to person have added many new helps to epidemiology. But the mode of spread of many diseases is still obscure, or a matter of conjecture. Presumably, contact with the case or with the healthy carrier or missed case accounts for the spread of many diseases, yet elucidation of the problem of such dissemination is still being sought.

One of the difficulties not yet surmounted is the apparent power of a microbe or ultravisible virus to produce either serious or mild cases, or to produce few cases at some period or for several periods, or to cause epidemics or interepidemics (the so-called recurrences), or great pandemics.

It is attractive to assume, in this order of importance, that the virus of a disease like influenza is widely distributed, that individual and even racial susceptibility plays an important rôle, and that the virulence of pandemic strains subsides for years or becomes innocuous. Microbic or viric subsidence from a virulent to a nonvirulent status has been suggested as a possible explanation of certain vagaries in the epidemiology of communicable diseases, particularly epidemic cerebrospinal fever (meningitis); but at present this is not quite susceptible of proof. For instance, the facility and frequency of occurrence of influenza is very manifest, as is its dual epidemiologic rôle of pandemics and interepidemics. Possibly exaltations in virulence do occur. Two epidemiologic facts stand out prominently as to the pandemic of influenza: that the so-called first wave was relatively slight and occurred in the spring; and that the second wave, occurring in the fall of the same year, was more explosive, more dangerous, more dispersive, more incapacitative, more depressive of mind. Possibly the former might be considered as a "tuning up" of the virulence of the causative factor.

Many diseases, especially measles and scarlet fever, seem to occur in cycles or at periodic intervals which are assumed to be due to an accumulation of the crop of susceptibles. Other diseases appear year after year with seasonal regularity. The reason for the two periodicities is not yet known. We know, however, that malaria is dependent on several factors in order to become epidemic or prevalent in a community. These factors include presence of human carriers of the parasite, presence of the parasite in the blood in sexually differentiated forms, abundance of infected mosquitos of a suitable variety, proximity and extensiveness of breeding areas. But even with all these present, infection may depend on the weather and temperature; for no matter how perfect the type of insect host or the number of carriers, the female mosquito will not convey malaria when temperatures are too low.

Besides affecting malaria, climatic conditions seem to affect other diseases and their virulence. For instance, African sleeping sickness is apparently limited to certain regions suitable to the tsetse fly. This is apparently true of Rocky Mountain spotted fever and its tick vector. Bubonic plague depends not only upon the flea of the infected rat or other rodent, but also quite definitely upon humidity.

Environment plays a most important rôle. Natural resistance to disease must assert itself in many ways, and this may partly depend upon dietary factors (in vitamins), partly upon rest. Fatigue is considered a marked contributor to tuberculosis and cholera. Sunlight helps prevent pneumonia and partly depends upon the measures taken against the smoke nuisance in cities. Overcrowding, because of improper housing conditions, undoubtedly plays its part in the spread of respiratory infections and epidemic cerebrospinal fever (meningitis).

The first American bathtub was used in 1842. Imagine American living standards of today accepting the presence of the louse or the unclean as in days of old! Likewise, sewage-contaminated water supplies, the sale of unwholesome raw milk from unhealthy cattle, the distribution of unprotected, understerilized or improperly preserved food supplies should no longer be tolerated.

There is no doubt that continued research in epidemiology, especially experimental, is needed in order to understand factors as yet unexplainable. In any event, the use of preventive measures against diphtheria with toxin-antitoxin or toxoid, and against typhoid fever and smallpox by vaccination has had a remarkable effect upon the reduction of these diseases. Preventive medicine and sanitation have not eliminated disease, but they have held pestilence in check. Because of the

rapidity of travel today, especially by air, with its associated possibilities in the spread of diseases, epidemiology must more than ever take its place as a protective science.

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(To be continued)

CLINICAL NOTES AND CASE REPORTS

INSTRUMENTAL PERFORATION OF THE RECTUM

By KENNETH E. SMILEY, M. D.
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PERFORATION of the rectum into the peritoneal cavity with the proctoscope, or with instruments passed into the rectum for treatment, has been reported infrequently, yet the danger must be recognized and constantly borne in mind. Without early recognition of the condition and prompt surgical repair of the perforation, fatal outcome is inevitable.

Injury to the rectum by falling on to sharp objects, by gunshot wounds, and by the sudden dilatation caused by compressed air is not uncommon. Spontaneous perforation or rupture caused by enemata under pressure may occur in ulcerative conditions, and indeed may occur spontaneously. Barron, in a very comprehensive paper on simple nonspecific ulcer of the colon, collected fifty cases from the literature and added three of his own. Spontaneous perforation into the peritoneal cavity occurred in the majority of these cases.

Brumbaugh reported a perforation following an attempt at sigmoidoscopy by an inexperienced individual. Goldman reports three such cases, the first in an individual with a normal bowel, the second in an individual who had had a severe diarrhea for several days, and the third occurring in a case of chronic ulcerative colitis.

REPORT OF CASES

Two cases of instrumental perforation are reported in this communication—one with a rectal stricture, and the other with probably a normal bowel.

CASE 1.—The first case is that of a male, age 52, who had neurosyphilis for which he had received intensive treatment for a number of years. He also had a stricture of the rectum of long standing. Because of this stricture, his physician had given him, two days previously, a Jelk's irrigating tube to use at home. The second time he used this, he experienced considerable difficulty passing the tube beyond the stricture, and experienced severe pain in the rectum. However, he irrigated the bowel and very shortly afterward began to have severe upper abdominal pain. He was seen by a physician, who made a provisional diagnosis of a tabetic crisis and gave morphin twice without relief, and then sent the patient to the hospital, where I saw him, it then being approximately twelve hours after the use of the irrigating tube. He appeared to be in great distress and exhibited all the classical signs and symptoms of shock. The abdomen was board-like and slightly distended, and a shifting dullness was present. On rectal examination, a stricture which admitted only the tip of the finger was found. Temperature was 97 degrees; pulse, 100; white blood count 4,000 with 67 per cent polymorphonuclears. A diagnosis of rupture of the rectum was made and, in spite of the very poor prognosis, operation was advised as offering the only hope of recovery. On opening the abdomen a large amount of seropurulent material was aspirated, and a perforation just above the peritoneal reflexion was found. The perforation was repaired with considerable difficulty owing to the extremely friable bowel wall, and the abdomen closed with drainage. The condition of the patient gradually became worse, and he died ten hours later.

* * *

CASE 2.—The second case I am allowed to report through the courtesy of a colleague. The patient was a woman, fifty-four years of age, who complained of vague upper abdominal distress. In the course of a complete study, a sigmoidoscopy was attempted by an inexperienced individual. It was stated that the patient complained of very severe pain at the time of the examination, and that the examiner believed he saw a small ulcer and a bleeding point on the bowel wall. The patient was fairly comfortable until two hours later, when she began to have severe, generalized abdominal pain, which gradually increased in severity and was accompanied by a board-like rigidity of the abdomen. A diagnosis of rupture of the rectum was made, but operation was refused. At autopsy a perforation of the rectum was found without indication of any previous pathology in the bowel wall.

Such accidents probably occur much more frequently than the reported cases would indicate, and yet in this day of the indiscriminate use of colonic irrigations by incompetent individuals, gyser-like enemata, and all types of rectal instrumentation, it is small wonder that we do not see perforations with much greater frequency.

With a history of some type of instrumentation or treatment, and with the usual signs and symptoms of perforation of the bowel, diagnosis should not be difficult. Early operation offers the only possible chance of recovery.

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AN UNUSUAL CONGENITAL UROGENITAL ANOMALY

REPORT OF CASE

By D E. F. EASTON, M. D.
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ON August 3, 1931, Mrs. L. G. came under observation for a pain in the left upper abdomen, which had been there since a severe fall in June. As a question of public liability was concerned, a complete physical examination was